

# PATENT SPECIFICATION

DRAWINGS ATTACHED

860,089



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**International Classification:** F02g, F06j.

## Improvements in or relating to sealing means.

### COMPLETE SPECIFICATION

We, REGIE NATIONALE DES USINES RENAULT, a French Body Corporate, of 8/10 Avenue Emile Zola, Billancourt, Seine, France, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to a sealing means between fixed or relatively movable co-axial cylindrical members in the presence of a fluid under pressure.

According to the invention there is provided a sealing means between fixed or relatively movable co-axial cylindrical members in the presence of a fluid under pressure comprising a packing of elastic material mounted directly on one of said members and having an annular body provided with an anchoring lug and having on one side two divergent flexible sealing lips applied respectively in tension against each of said members, the body of the packing being elongated axially and having a plurality of successive annular beadings which ensure the bearing between said cylindrical members while leaving annular grooves between them.

Thus in a sealing means according to the invention the body of the packing will provide a guiding or centering means for the two co-axial cylindrical members and the flexible lips will be applied, one to each of said members, by the pressure of the fluid to form a reliable fluid-tight seal.

When the sealing means is used in a piston and cylinder arrangement the flexibility of the lips permits the seal to be maintained even if the cylinder size lies outside the permitted tolerances or if the cylinder is somewhat oval or not perfectly straight. Moreover, since the body of the packing is compressible it will guide the piston in its movement without causing jamming at any tight spots in the cylinders.

The annular grooves left between the beadings on the body will collect lubricant and thus assist in lubricating the moving parts and also will collect impurities or other foreign bodies which otherwise might damage the walls of the cylinder.

In certain applications the packing may in addition be utilized to form a shock absorber at the end of travel of a piston, for example. The packing then includes a shock-absorbing beading which is provided for this purpose only or which may also serve as the anchoring lug.

It should also be noted that packings intended for high working pressures should have smaller lips than packings intended for low working pressures. Since the lips are pressed against the cylindrical members by the pressure of the fluid it will be seen that a large contact surface with high pressure of the fluid would give rise to a considerable resistant force which would detract from the efficiency of the appliance in which the sealing means is used.

Specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figures 1 and 2 are axial half-sections of a piston packing for low and medium pressures, shown before and after fitting on the piston,

Figures 3 and 4 are similar views of a piston packing for an appliance using high pressure.

Figures 5 and 6 are axial half-sections of a stuffing-box packing, represented by itself and after installation,

Figures 7 and 8 are axial half-sectional views of a modified embodiment of a piston packing, for high pressure purposes,

Figures 9 and 10 are similar views of another embodiment of a piston packing with shock-absorbing beading, and

Figure 11 is a view in longitudinal section

of a pneumatic jack, intended to illustrate various applications of the packings.

The piston packing of elastic material for low or medium pressure, shown in Figures 1 and 2, comprises two divergent flexible lips 80 and 82, which are mounted in tension between a piston 83 and a cylinder 81. The relatively sliding lip 80 ensures fluid-tightness against the wall of the cylinder 81, and the static lip 82 ensures fluid-tightness against the piston 83. The annular body 84 of the packing is elongated in the sliding direction of the packing in such a way as to guide the piston better and simultaneously to give a suitable centering to the packing, its peripheral part being provided with circular beadings 85 which, without lessening the desired guidance, help to reduce as much as possible the friction of the packing in the cylinder while protecting the lips from any possible harmful stresses.

It will be seen that the body 84 of the packing, when this is placed in position on the piston 83, is suitably shouldered on the side opposite to the action of the pressure fluid, against a part 86 of the piston, its fixing being secured by an anchoring lug 87, prolonged in the sliding direction of the packing and embedded in a circular groove 88 in the piston. The packing is thus safely held, yet it is still easy to put in place, because it is sufficient when fitting it to give it a relatively small extension in order to bring the anchoring lug 87 into place.

Figures 3 and 4 show a piston packing designed for use at high working pressure. At high working pressures the body of the packing is subjected to longitudinal compression and there is a resultant transverse component force which hampers the sliding of the packing. A comparison of Figures 2 and 4 will show the reduction in size of the compressible part of the packing, which in this embodiment consists only of the portion 89, which rests against a shoulder 92 on the piston and the compressibility of which is negligible. The body of the packing carries sealing lips 80 and 82 and also the beadings 85 which form a bearing and end on the side opposite to the lips with an anchoring beading 90, which lodges in a groove 91 formed in the piston beyond the shoulder 92 over which the packing straddles.

Figures 5 and 6 represent a stuffing-box packing intended for use with low or medium pressure. The packing of elastic material comprises a body extended in the direction of sliding of the rod 93 and housed in an enclosure formed by two components 94 and 95. This packing also has on the side internal to the cylinder a sliding lip 96 and a static lip 97. The surface of the packing which contacts the rod 93 carries beadings 98 and, at the end opposite the lip 96, a scraper lip 99 for protecting the

seal against dust. A circular cut-out 100 is provided in the body of the packing to allow a certain amount of compression of the body of the packing under pressure, so as to avoid any expansion of the packing which might reduce the efficiency of the appliance.

Figures 7 and 10 represent piston packings derived from that shown in Figures 3 and 4.

Figures 7 and 8 show a packing capable of ensuring a strict but flexible guidance, the zone of the bearing beadings 85 being more extended than in the packing shown in Figures 3 and 4, and these beadings are formed on the external and internal surfaces. This packing for use with higher pressures has, furthermore, curved lips 80, 82 and for the reasons already given, a reduced compressible part 89.

In certain installation conditions when this packing is fitted on a piston, the anchoring beading 90 can be used as a shock absorber. Figure 11, which relates to a double-acting pneumatic jack with automatic return to dead centre, shows packing of the kind shown in Figure 7 fitted to small auxiliary pistons 101, which travel in a pressure enclosure 102. The action of the pistons 101 tends to bring them in abutment against their respective shoulders 103, with the interposition of the beading 90.

A shock absorber may also be provided on the side of the fluid-tight lips, by providing between them a thrust ring such as 104 (Figures 9 and 10), here intended to co-operate with an end wall of the cylinder at the end of the piston's travel. The stop 104 may suitably be supported by the shoulder 92 provided for the packing, and may be subjected to considerable compression without any appreciable deformation of the packing taking place. This arrangement preserves the properties of the packing even under high pressures in use, for which the shortening of the lips, furthermore, favours this embodiment with a shock absorbing element.

The jack shown in Figure 11 also illustrates an example of application of this shock-absorbing packing, which is fitted to two elements 105 of the principal piston, whose movement is here damped at the end of its travel against the end walls of the cylinder 106 or 107. The shock-absorber ring here has radial grooves 108 intended to allow fluid to be admitted over the whole surface of the piston, when this is in the end stop position and in order to facilitate its release from this end position. Here again is seen a stuffing-box packing in accordance with the invention, introduced between the end wall of the cylinder 106 and a screwed ring 109.

## WHAT WE CLAIM IS:

1. A sealing means between fixed or relatively movable co-axial cylindrical members in the presence of a fluid under pressure comprising a packing of elastic material mounted directly on one of said members and having an annular body provided with an anchoring lug and having on one side two divergent flexible sealing lips applied respectively in tension against each of said members, the body of the packing being elongated axially and having a plurality of successive annular beadings which ensure the bearing between said cylindrical members while leaving annular grooves between them.

2. A sealing means as claimed in claim 1, wherein a circular groove is provided at the base of each lip at the point of connection between said lip and the body of the packing.

3. A sealing means as claimed in claim 1 or claim 2, wherein the body of the packing is of a thickness substantially equal to the distance apart of the lips and the anchoring lug engages in a corresponding seating provided on the member carrying the packing, said member forming further a shoulder supporting said body on the side opposite the sealing lips.

4. A sealing means as claimed in claim 3, wherein the anchoring lug has at least one central circular aperture.

5. A sealing means as claimed in claim 1 or claim 2 more particularly for high working pressures, wherein the body of the packing is of a thickness much less than the distance between the lips and thus has a section consisting of two rectangular arms, one carrying the lips and supported

against a shoulder of the member carrying the packing, the other surrounding said carrying member and ending in the anchoring lug which engages in a corresponding seating provided on said carrying member.

6. A sealing means as claimed in claim 5, wherein the anchoring lug is a beading placed with a lateral overlap in respect of the member carrying the packing, in particular to serve as a stop member.

7. A sealing means as claimed in claim 5, wherein the packing has a rim located between the lips and overlapping the end of said lips to serve in particular as a stop member.

8. A sealing means as claimed in claim 6, wherein the anchoring lug has laterally radial incisions.

9. A sealing means as claimed in claim 7, wherein the rim has laterally radial incisions.

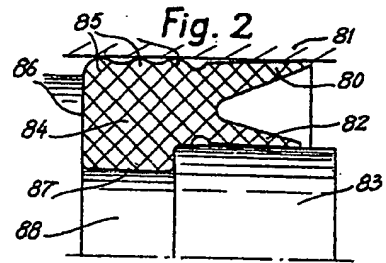
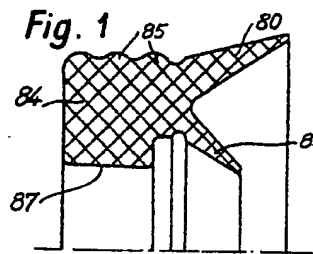
10. A sealing means substantially as hereinbefore described with reference to and as illustrated in Figures 1 and 2, or Figures 3 and 4, or Figures 5 and 6, or Figures 7 and 8, or Figures 9 and 10 of the accompanying drawings.

11. A pneumatic jack having sealing means as claimed in claim 1, substantially as hereinbefore described with reference to and as illustrated in Figure 11 of the accompanying drawings.

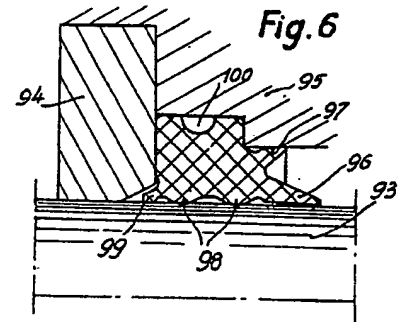
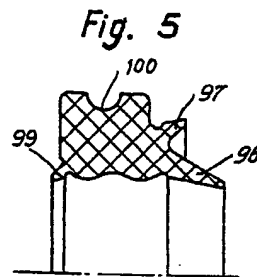
REGIE NATIONALE DES USINES  
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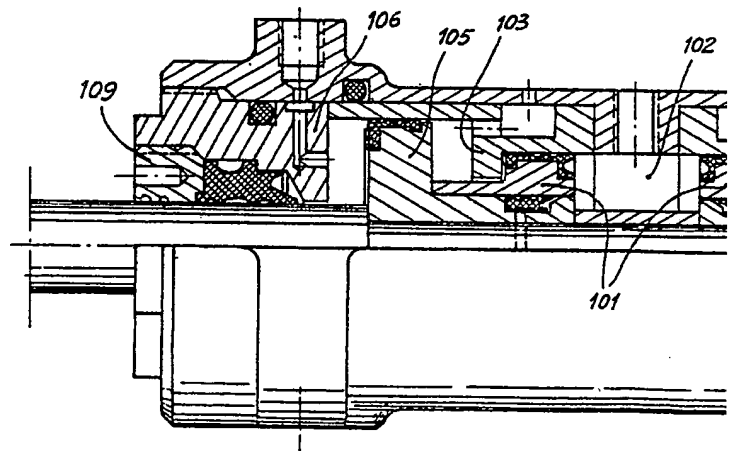


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8.

**Fig. 11**



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1 SHEET

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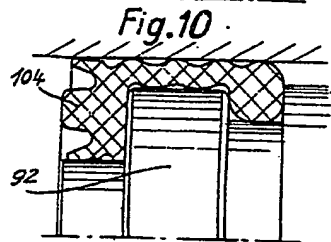
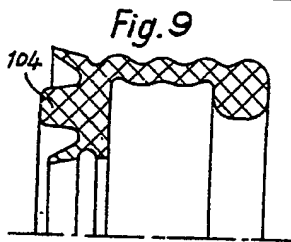
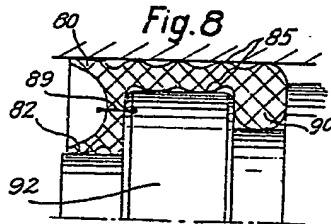
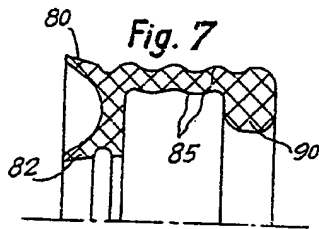
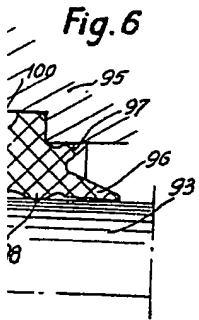
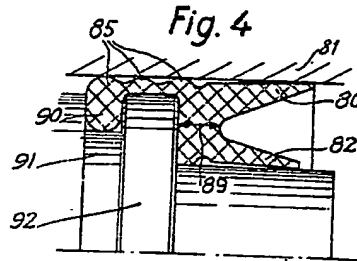
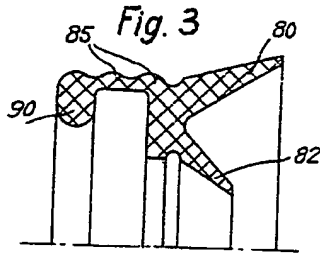
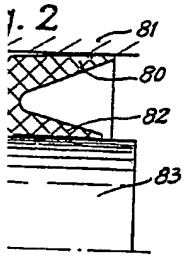
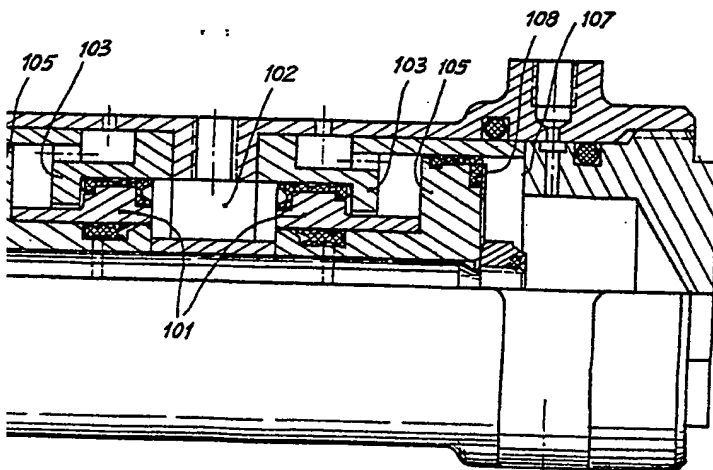


Fig. 11



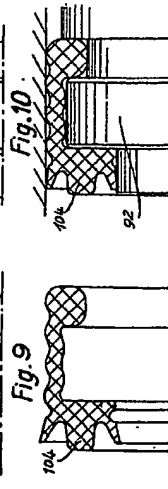
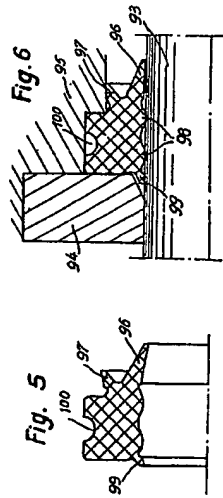
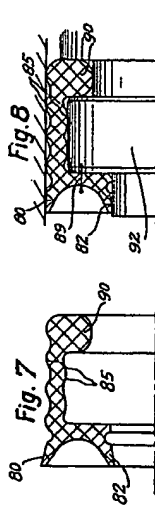
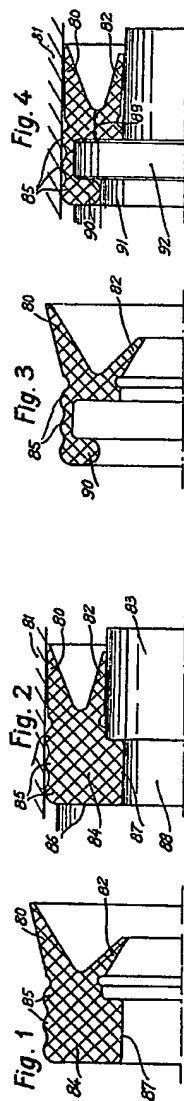


Fig. 11

